

Derev 58551

Work Order ID: 48577

Friday, June 26, 2009 10:38:38 AM

Page 1



Item ID: D350-748-101

Accept

Setup Start

Revision ID: D

Stop

Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009 Start Qty: 1.00

Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals: Process Plan: *mk*

Date: 15/7/09 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
N/A	Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

8/10/09

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-101 using CNC bender program D350F and Folio FT

9-8-16

120

0.00



QC15- Crosstube Dimensional Check

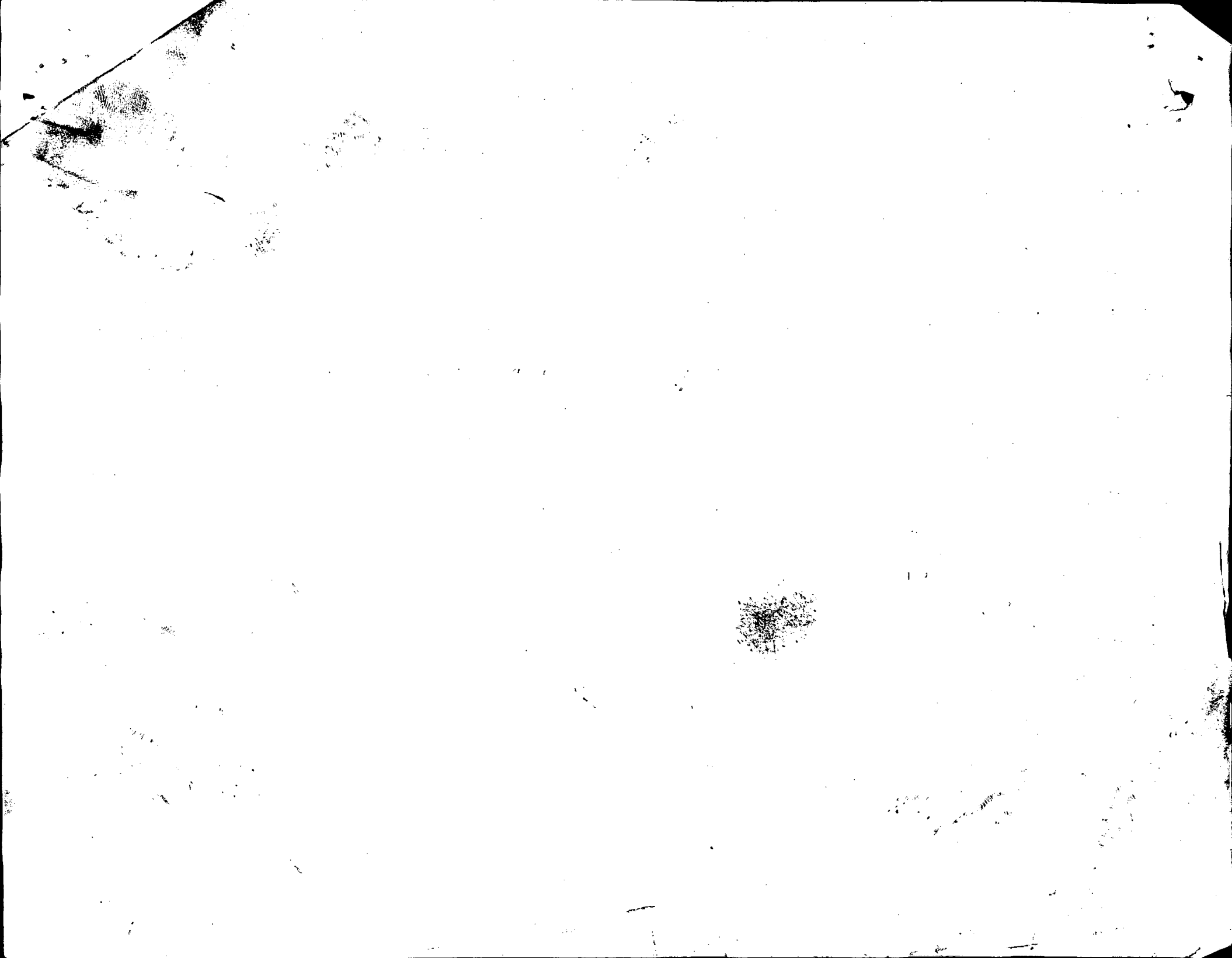
QC

Memo

0.00

Quality Control

10/09-16



Work Order ID 48577

Friday, June 26, 2009 10:38:38 AM



Page 2

Item ID: D350-748-101

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Required Date: 8/3/2009 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

130

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs, □
Set-up drill table as per QSI 010 □ 2-Deburr □ 3-Engrave Part # and Batch # as per
Dwg D350-748-141 □ 4-Remove all marks from tube within limits of D350-748-
141 □ 5- Apply a light coat of

- M109956 - AWM 7-7-20
- AWM 7-7-21

M 9-7-20

140

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

CHECK 10 DEG HOLES WITH DT8876E(EUROCOPTER CLAMP)

27 Soglar 21 (X) /

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00



Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O: 11282 10132 □ Stress relief at 375° for 5 hours □ Magnetic
Particle Inspect per ASTM E1444 □ Cadium Plate per AMS-QQ-P-416B, Class
1, Type 2 □ Embrittle relief at 375° for 8 hours, Chromate Treat □ Possible
Supplier: Southwest United Industries □ Ens

BS 10-2-01

U. 91-07-21

Work Order ID 48577

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Item ID: D350-748-101

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Start Date: 7/15/2009 Start Qty: 1.00

Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

160

Receive & Inspect for Damage & Mat'l Certs

0.00

Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

170

QC5- Inspect part completeness to step on W/O

0.00

QC

Memo

0.00

Quality Control

180

SprayPaint

0.00

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2



9/8/18 C
Per 3/01

⊗ ⊗

m 10 04 19 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: X- tubes NCR: Yes No DQA: _____ Date: 1005.11
 Resolution: rework Disposition: rework QA: N/C Closed: _____ Date: 10/05/12

NCR: 48557		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
09.08.26	160	Pits in paint caused from dust during CAD. R.C. process.	UP 09.08.26	Strip area and inspect, get eng disposition - CAD was affected when sanded. - Tube was re-cathodized. on PO 513885	RT 09-08-26		UP 09.08.26 per 451 042	

NOTE: Date & initial all entries

Work Order ID 48577

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Item ID: D350-748-101

Accept

Setup Start

Revision ID: D

Stop

Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009 Start Qty: 1.00

Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

1 _____ 10.04.20

200

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Install Ground wire Insert, then insert screw and washer □ 2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035. □ 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

ml 10 04 20 (1)

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8.04.20

40 _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: NCR10-026 Fault Category: Cross tubes NCR: Yes No DQA: Yes No Date: 10/05/11
 Resolution: Accepted Disposition: Use as is QA: N/C Closed: Yes No Date: 10/05/12

NCR: <u>48577</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>10-05-10</u>		<u>NCR 10.026 → Reviewing the cross tubes, to ensure they are good, from the above NCR</u>	<u>CP</u> <u>10.05.10</u> <u>per</u> <u>OSI 042</u>	<u>load test per David's email ref NCR 10.026</u>	<u>CP</u> <u>10/05/10</u>	<u>CP</u> <u>10.05.10</u> <u>per</u> <u>OSI 042</u>	<u>OSI 042</u>	<u>10/05/10</u>
			<u>CP</u> <u>10.05.10</u> <u>per</u> <u>OSI 042</u>	<u>touchup/repaint as necessary replace corrosion strap if required</u>	<u>MM</u> <u>10-05-10</u>	<u>S</u> <u>10/05/10</u>	<u>OSI 042</u>	<u>10/05/10</u>

NOTE: Date & initial all entries

L Lacelle

From: David Shepherd [dshepherd@dartaero.com]
Sent: April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

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Item ID: D350-748-101

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Setup Start



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Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-4-28sf

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

Suslu

(40)

240

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D350-748-101 □ Location: _____ □ PPP Rev: 13

POSITIVE RECALL

EFFECTIVE

AUTH

RELEASED

DATE

NCR 10-026

see w/o NCR for CP's sign

Prop 11 ①

Work Order ID 48577

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Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

250

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

*2005.11**u 2005.11**~~12-24~~*

Picklist Print

Friday, June 26, 2009 10:38:37 AM

Page 1

Work Order ID: 48577

Parent Item: D350-748-101RevD

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009

Required Date: 8/3/2009

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L5		Purchased		No		120 220	Each	0.0000	4.0000			
Nut												
ALS4-1032-225		Purchased		No		200	Each	0.0000	1.0000			
Insert												
AN960JD10		Purchased		No		200	Each	0.0000	1.0000			
Washer												
D2856-400RevA		Manufactured		No		200	f	0.0000	1.2432			
Abraison Strip												
D3502-1RevB		Manufactured		No		200	Each	0.0000	2.0000			
Support												
D350-748-101RevD		Manufactured		No		200	Each	0.0000	1.0000			
Crosstube Turning Detail												
MS21920-20		Purchased		No		200	Each	0.0000	2.0000			
Clamp (per MIL-DTL-8783C)												
AN4-6A		Purchased		No		230 220	Each	0.0000	16.0000			
Bolt												
AN5-32A		Purchased		No		230 220	Each	0.0000	4.0000			
Bolt												

M114108 10-4-285

110768 ml 10.04.20

110985 ml 10.04.20

56626 ml 10.04.20

52903 ml 10.04.20

112307 ml 10.04.20

M112933 10-4-285

M113121 10-4-285

AN4-41A Qty 25 m + 110731 10-4-285
sidouk28

Picklist Print

Friday, June 26, 2009 10:38:38 AM

Page 2 / 2

Work Order ID: 48577



Parent Item: D350-748-101RevD



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009

Required Date: 8/3/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD416 	NA51149004632	Purchased	No			230 220	Each	0.0000	32.0000			
Washer												
AN960JD516 	NA51149005635	Purchased	No			230 220	Each	0.0000	8.0000			
Washer												
D3501-1RevA 		Manufactured	No			230 220	Each	0.0000	16.0000			
Bushing												
MS21042L4 		Purchased	No			230 220	Each	0.0000	24.0000			
Nut												
MS27039-1-10 		Purchased	No			230 220	Each	0.0000	1.0000			
Screw												

M113706 11-04-2009

M113704 11-04-2009

B 45918 10-4-2009

M114108 10-4-2009

B 112794 10 04 20

220 10-4-28 SL

D3500-1
Saddles at 4 B* ~~220~~
47119

Date: Monday, 15/06/2009 9:50:12 AM
 User: Julie Dawson

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : 350/355 AS X-TUBE FWD
Job Number : 48577	
Estimate Number : 12485	
P.O. Number :	Part Number : D350748101
This Issue : 15/06/2009 S.O. No. :	Drawing Number : N/A
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : CROSSTUBES	Drawing Revision : D
Previous Run : 48576	Material :
Written By :	Due Date : 10/07/2009 Qty: 1 Um: Each
Checked & Approved By : <u>JUL 09.06.15</u>	
Comment : Est Rev:A New Issue 06-07-05 JLM Est Rev:B Update qty of MS21042L5 06-09-12 KJ Est Rev:C Rev B 07-11-15 DD Est Rev D Combined manufacturing 08.04.02 EC verified by: DD Est Rev:E 08-06-24 revD as per dwg DD verified by:EC	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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✓ 1.0	DC	DOCUMENT CONTROL
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Comment: Photocopy bluefile & type labels per PPPD350-748-101 CHG001

✓ 2.0	D350748141TRN	Crosstube Turning Detail
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
 CROSSTUBE TURNING DETAIL
 batch _____

✓ 3.0	BENDING	BENDING MACHINE - SKIDTUBES
-------	---------	-----------------------------



Comment: BENDING MACHINE
 Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT MB 09-07-20

✓ 4.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-------	------	------------------------------



Comment: DIMENSIONAL CHECK OF X-TUBES

✓ 5.0	CROSSTUBES	CROSSTUBES RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
 Set-up drill table as per QSI 010

2-Deburr

MB 09-07-20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 15/06/2009 9:50:12 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 48577

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

✓ 3-Engrave Part # and Batch # as per Dwg D350-748-141

11 9-7-20

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: M109956

— Ann 9-7-21

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CHECK 10 DEG HOLES WITH DT8876E(EUROCOPTER CLAMP)

Soder 121 (X)

7.0

OUTSIDE SERV.11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: _____

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

10.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Prime Outside of Tube as per Dart QSI 005 4.2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 15/06/2009 9:50:12 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 48577

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

11.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

12.0

D35021

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

SUPPORT

Batch: _____

13.0

D2856400

Abrasion Strip



Comment: Qty.: 1.2401 f(s)/Unit Total : 1.2401 f(s)

Abrasion Strip 7.10" long x2

Batch: _____

14.0

ALS41032225

Insert



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Insert

Batch: _____

15.0

AN960JD10

Washer



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Washer

Batch: _____

16.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Clamp (per MIL-DTL-8783C)

Batch: _____

17.0

MS27039110

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Screw

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 15/06/2009 9:50:12 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 48577

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abraison strips as per Dwg D350-748-141 & QSI 035.

3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

21.0

D35001

Saddle



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

350 SADDLE

Batch: _____

22.0

D35011

Bushing



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

BUSHING

Batch: _____

23.0

AN46A

Bolt



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

Bolt

Batch: _____

24.0

AN441A

bolt



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

bolt

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 15/06/2009 9:50:12 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 48577

Part Number: D350748101

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

25.0	✓ AN532A	Bolt
------	----------	------



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
Batch: _____

26.0	✓ AN960JD416	Washer
------	--------------	--------



Comment: Qty.: 32.0000 Each(s)/Unit Total : 32.0000 Each(s)
Washer
Batch: _____

27.0	✓ AN960JD516	Washer
------	--------------	--------



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)
Washer
Batch: _____

28.0	✓ MS21042L4	Nut
------	-------------	-----



Comment: Qty.: 24.0000 Each(s)/Unit Total : 24.0000 Each(s)
Nut
Batch: _____

29.0	✓ MS21042L5	Nut
------	-------------	-----



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Nut
Batch: _____

30.0	✓ QC4	INSPECT 100% KITS FOR COMPLETENESS
------	-------	------------------------------------



Comment: INSPECT 100% KITS FOR COMPLETENESS

31.0	✓ PACKAGING 1	PACKAGING RESOURCE #1
------	---------------	-----------------------



Comment: PACKAGING RESOURCE #1
Identify and pack for shipping as per PPP D350-748-101
Location: _____
PPP Rev: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 15/06/2009 9:50:13 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 48577

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

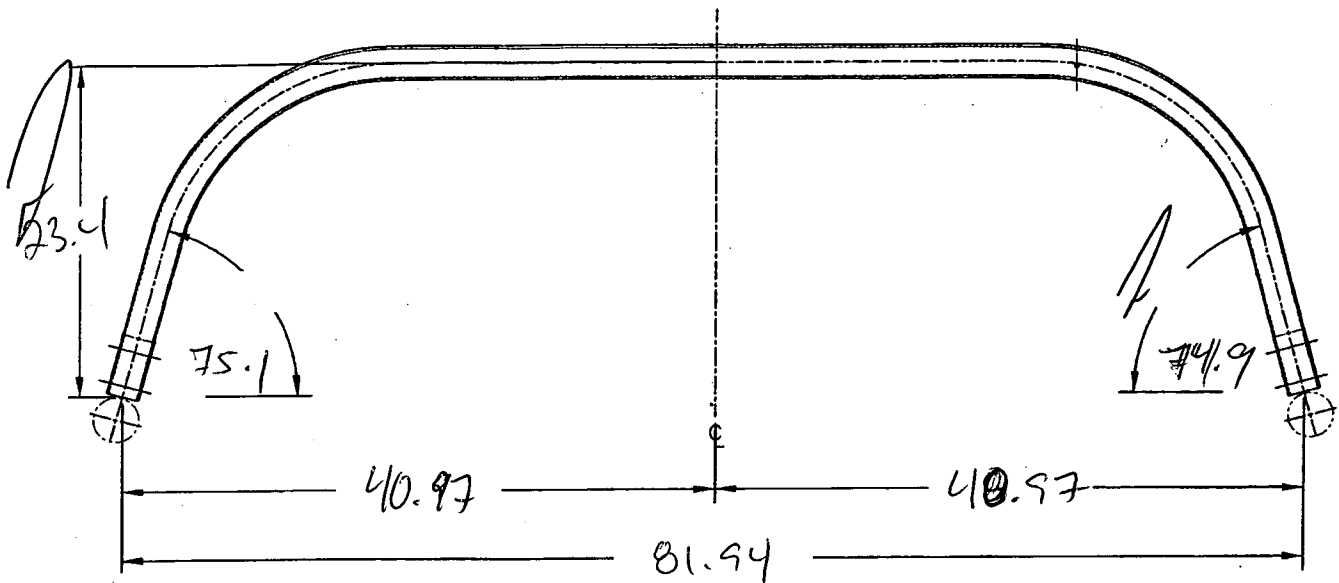
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	48577
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
0.200" twist from cuff → cuff

QC15 Inspection	<i>[Signature]</i>
Date	06/17/16

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM <i>[Signature]</i>	<i>[Signature]</i>

DART

DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>HA</i>	APPROVED <i>HA</i>	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD) NTS	
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

RELEASED

06.10.31 *HA*

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

UNDER REVIEW

09.02.05
PER PCR #09.001**D350-748-141 CROSSTUBE:**

- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

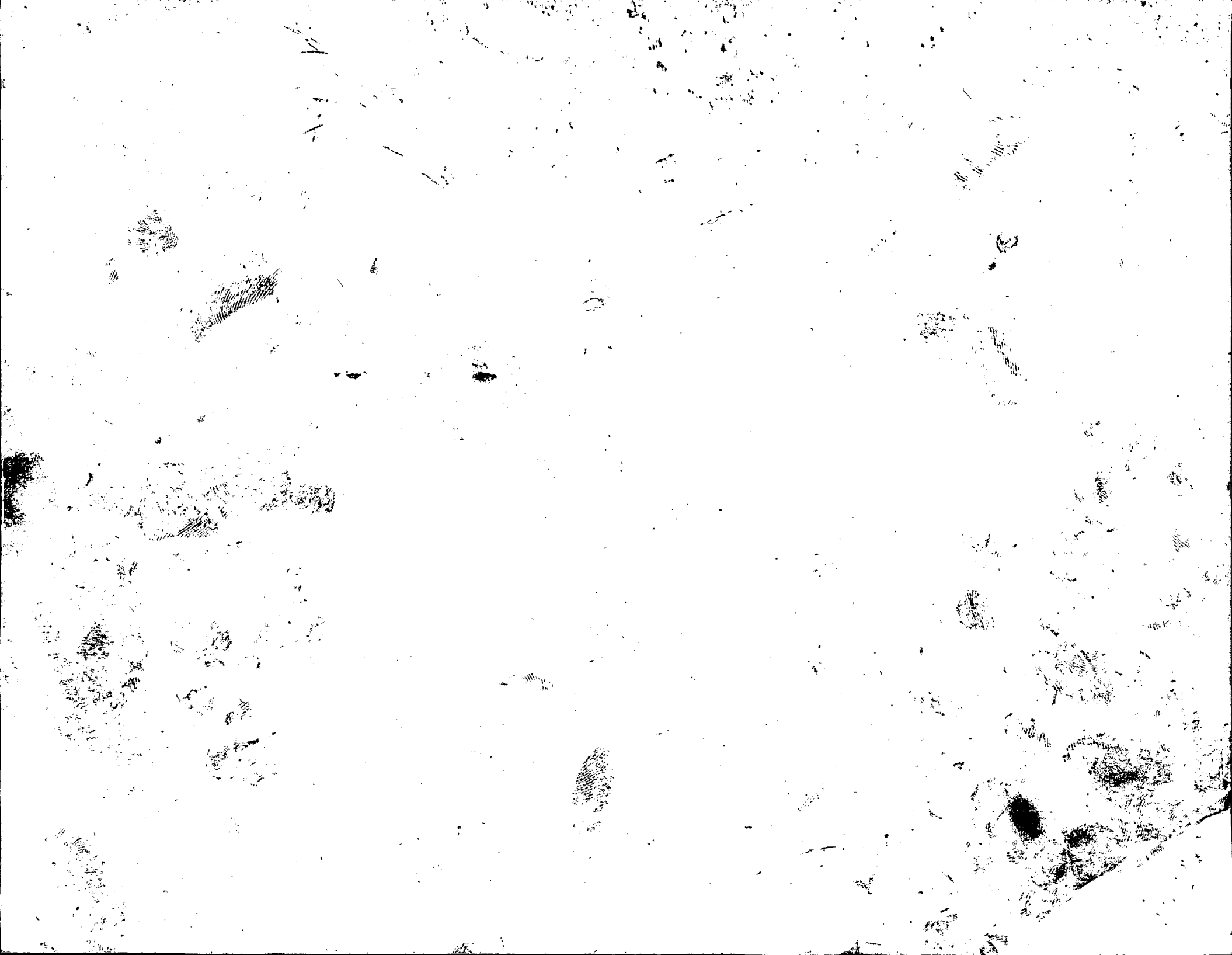
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RETURN TO
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
7857

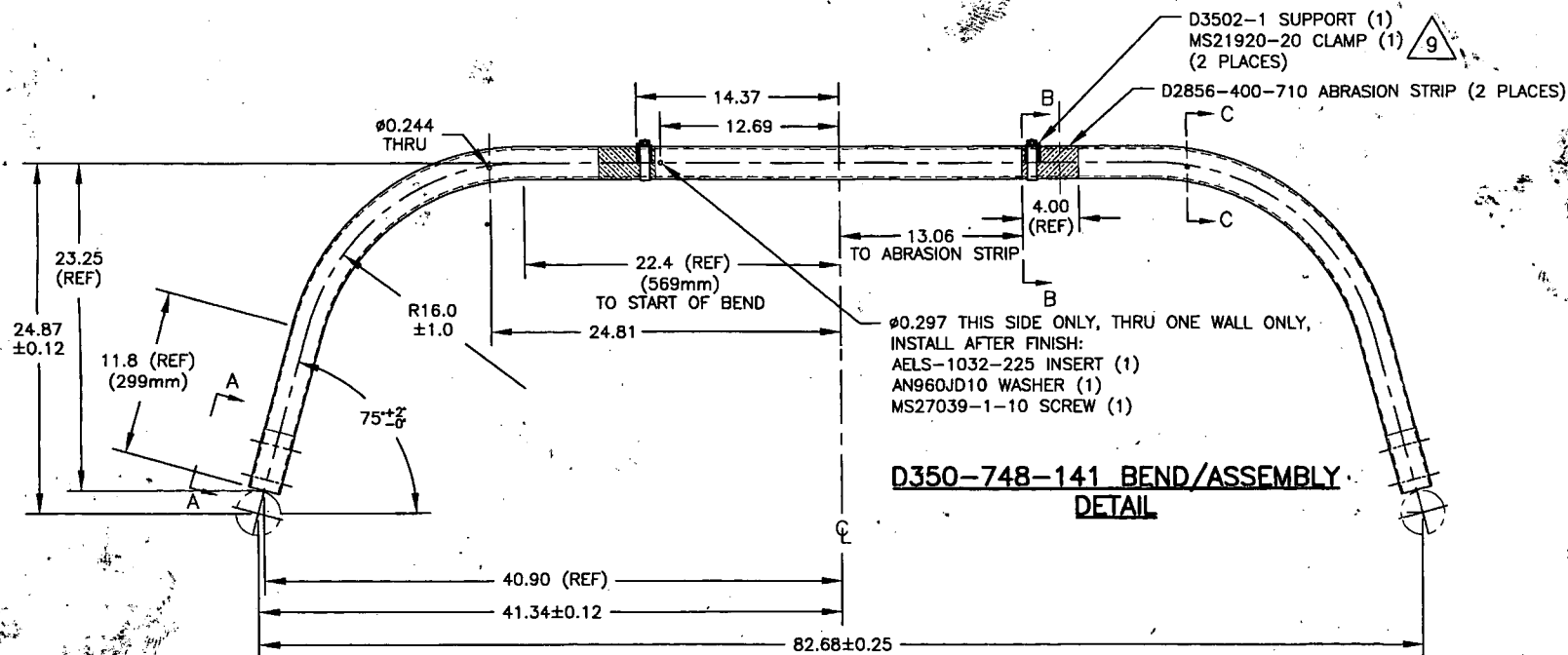
UNDER REVIEW

OK 07.10.22

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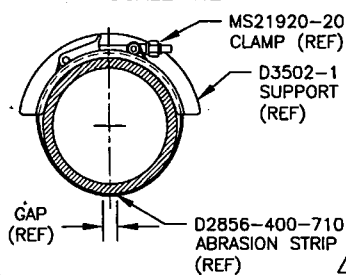




D350-748-141 BEND/ASSEMBLY DETAIL

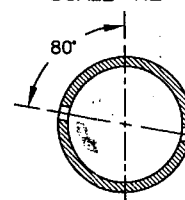
SECTION B-B

SCALE 1:2



SECTION C-C

SCALE 1:2



UNDER REVIEW

09.02.05

UNDER REVIEW

09.16.05

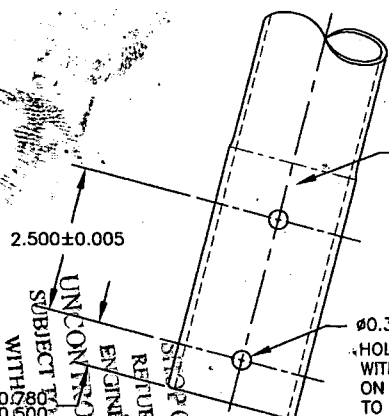
OK 06.10.22

RELEASED

06.10.31

VIEW A-A

SCALE 1:2



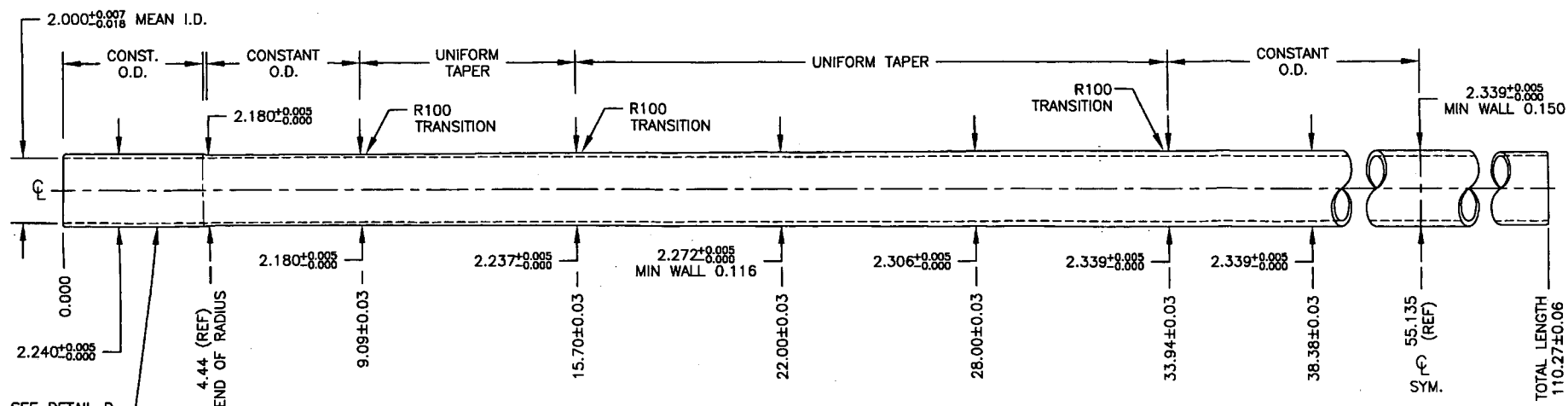
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DESIGN	q	DRAWN BY	q	DART	DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA
CHECKED	#	APPROVED	#	DRAWING NO.	D350-748-141
DATE	06.10.31	TITLE	CROSSTUBE (AS 350/355 HI FWD)	SCALE	1:8

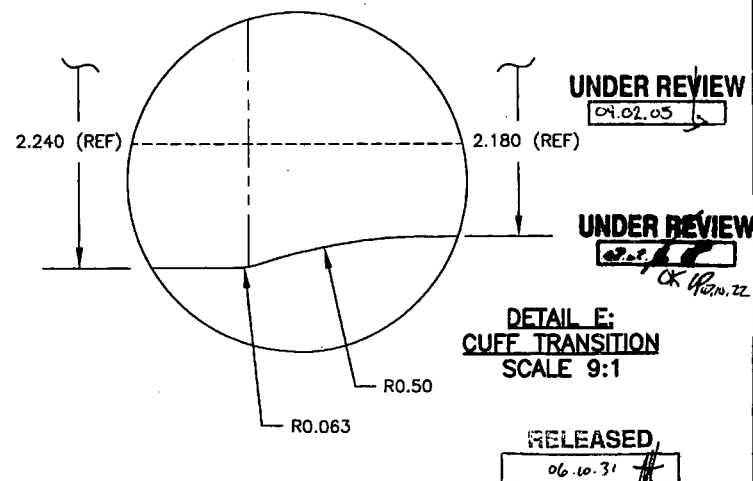
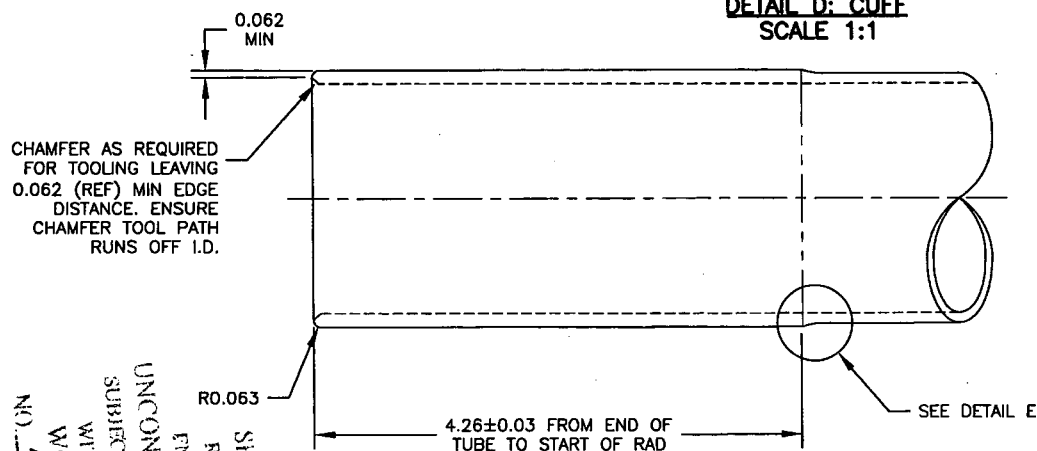
REV. D
SHEET 2 OF 3

NO. 178577
UNCONTROLLED COPY
RETURN TO
ENGINEERING
SUBJECT TO AMENDMENT
WITH NOTICE
WORK ORDER



D350-748-141 MACHINING DETAIL

DETAIL D: CUFF
SCALE 1:1



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DESIGN #	DRAWN BY #	DART	DART AEROSPACE LTD. HAMMERSLEY, OXFORD, CANADA
CHECKED #	APPROVED #	DRAWING NO. D350-748-141	REV. D SHEET 3 OF 3
DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE 1:3	

NO. 48517
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
RETURN TO
ENGINEERING
SHOP COPY

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Aug-14-2009

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 88573

INVOICE #: 45705

**CONTRACT OR
PURCHASE ORDER # 513963**

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B48577

**STRESS RELIEF BAKE @ 375 DEG. FOR 5 HRS. BAKE HEAT CHART
#10734. MPI INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW
AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS 2. BAKE HEAT CHART
#10785.**

S 9/10/25

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A large, stylized handwritten signature in ink.

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Feb-22-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 93266
INVOICE #: 48326

**CONTRACT OR
PURCHASE ORDER #** 513885

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B48577

**STRESS RELIEF BAKED @ 375 DEG. FOR 5 HRS. BAKE HEAT
CHART #10-116. MPI INSPECTED IAW ASTM-E-1444. CADMIUM
PLATED IAW AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS 1. BAKE
HEAT CHART #10-169.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A large, stylized handwritten signature in black ink.

Work Order ID 48577

Friday, June 26, 2009 10:38:38 AM



Item ID: D350-748-101

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 7/15/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 8/3/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: mk Date: 15/7/09 Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
N/A	Rev D								

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

C21014/21

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT _____

9-2-16

REFERENCE ONLY

120

0.00



QC15- Crosstube Dimensional Check

QC

Memo

0.00

Quality Control

9-2-16